

Bioimpedance-defined overhydration predicts survival in end stage kidney failure (ESKF): systematic review and subgroup meta-analysis

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Supplementary Material

(1) Supplementary Table 1

(2) Appendix Summary of the strategy used whilst searching CENTRAL.

Supplementary Table 1: Summary of co-variates included in multivariable survival analyses (MVSA) within (a) End-Stage Kidney Failure and (b) Heart Failure Cohorts

(a) End Stage Kidney Failure Cohorts																																			
Author(s)	Year	Prim. Outcome	N(Mort)	MVA Type	Co-morbidity matrix for covariates included in MVSA																								BI-OH Method						
					Censored	Age	Ethn	Gen	BMI	Modality	Vintage	Hospital stay	DM	P/CVD	Comorb	Chol	CRP	IL-6	HIV	CKD	NHYA	HF	BP	LVEF	Alt/Echo	BNP	Trop	HbA		KtV/Cr	Alb	Phos	D/pCr	NonBIA	RRF
Abad	2011	Mortality	100	Cox analysis	N	X		X			X																								PA*
Avram	2006	Mortality	89	Cox analysis	N	X	X	X					X																						PA*
Beberashvili	2014	Mortality	38	Cox analysis	N	X		X		X	X		X	X																					PA**
Beberashvili	2014	Mortality	64	Cox analysis	Y	X		X		X	X		X		X			X									X				X	X			PA***
Caetano	2016	Mortality	66	Cox analysis	Y	X		X		X	X		X																						OHI**
Chazot	2012	Mortality	Unclear	Cox analysis	Y			X	X	X	X									X															OHI**
Chen	2007	Mortality	58	Cox analysis	Y	X		X							X												X	X	X		X				ECWR**
de Araujo	2013	CV Events	13	Cox analysis	Y	X				X							X								X										PA
Dekker	2017	Mortality	Unclear	Cox analysis	Y	X		X	X		X		X	X						X												X			OHI**
Demirci	2016	Mortality	93	Cox analysis	Y			X	X		X		X							X						X	X								BIVA**
Di Iorio	2004	Mortality	75	Cox analysis	N																														PA*
Fan	2015	Mortality	37	Cox analysis	N	X							X																X						ECWR**
Fein	2002	Mortality	4	Univariate analysis																								PA****							
Fein	2008	Mortality	21	Cox analysis	Y	X	X	X					X																						ECWR*
Fiedler	2009	Mortality	36	Cox analysis	Y	X		X			X		X																						PA**
Guo/Guo	2015	Mortality	52	Cox analysis	Y	X		X					X		X		X				X					X	X		X			X			ECWR**
Hoppe	2015	Mortality	42	MLR	N								X			X						X		X											OHI
Huan-Sheng	2016	Hospitalisation	13	Cox analysis	N	X		X																											OHI
Jotterand-Drepper	2016	Mortality	19	Cox analysis	Y											X			X				X	X			X								OHI**
Kim	2015	Mortality	50	Cox analysis	Y	X		X					X	X												X	X	X	X						OHI**
Kim	2017	Mortality	24	Cox analysis	Y	X							X							X															ECWR**
Koh	2011	Mortality	35	Cox analysis	N	X		X			X		X							X						X	X	X							PA**

[illegible]

(b) Heart Failure Cohorts																																		
Author(s)	Year	Prim. Outcome	N (Mort)	MVA Type	Co-morbidity matrix for covariates included in the MVSA																							BI-OH method						
					Censored	Age	Ethn	Gen	BMI	Modality	Vintage	Hospital stay	DM	P/CVD	Comorb	Chol	CRP	IL-6	HIV	CKD	NHYA	HF	BP	LVEF	Alt/Echo	BNP	Trop		HbA	Ktv/Cr	Alb	Phos	D/PCr	NonBIA
Alves	2016	Mortality	34	Cox analysis	N	X																												PA**
Castillo-Martinez	2007	NYHA Class	N/A	Univariate analysis																														PA+BIVA****
Colin-Ramirez	2012	Mortality	66	Cox analysis	N								X																					PA**
Doesch	2010	Comparison with CMR.	8	Univariate analysis																														PA
Sakaguchi	2015	EF Survival	37	Cox analysis	N	X												X				X		X		X							X	ECWR**
Trejo-Velasco	2016	Adverse Events	37	Cox analysis	N	X												X																BIVA**

Supplementary Table 1. Abbreviations and key: N (Mort) = number of endpoints (Defined in table 1). Covariates included in the MVSA are identified in the matrix: covariates coded “ ” are included in the MVSA and independently predict the primary outcome, “X” indicates they do not predict outcome, “†” indicates in multi-study cohorts that the covariate was only included in 1 study and was not predictive of the primary outcome and blank squares denote the covariate was not included. BI-OH = type of measure used as described with abbreviations in text. MLR = Multiple Linear Regression, Ethn = ethnicity, Gen = gender, BMI = Body Mass Index, DM = diabetes mellitus, CVD = cardiovascular disease, Comorb = comorbidity Index (e.g. Charlson index), Chol = cholesterol, NHYA = NHYA classification of dyspnoea, HF = heart failure, LVEF = left ventricular ejection fraction, Alt/Echo = non LVEF echocardiographic measurements, BNP = brain natriuretic peptide, Trop = Troponin, HbA = Haemoglobin / Ferritin, KtV = KtV or creatinine, Alb = albumin, Phos = phosphate, PSTR = peritoneal solute transport rate, NonBI Nut = Other nutritional markers (i.e. SGA), RRF = residual renal function, Prev Adm = previous admission to hospital.

Appendix: summary of the strategy used whilst searching CENTRAL.

Each individual term is numbered, with the number of results for each search term being given at the end in parentheses.

Initial Search Process	
MeSH	Individual Search Terms
(1) "Renal Dialysis" (4417)	(5) "dialysis" or "hemodialysis" or "haemodialysis" or "peritoneal dialysis" or "renal replacement therapy" (11964)
(2) "Chronic Kidney Disease" (3481)	(6) "end stage renal failure" or "esrf" or "end stage renal disease" or "esrd" or "chronic kidney disease" or "ckd" or "renal failure" or "kidney failure" or "renal insufficiency" or "kidney insufficiency" or "renal injury" or "kidney injury" (13450)
(3) "Electrical Impedance" (360)	(7) "bioimpedance" or "bio-impedance" or "bioimpedance analysis" or "bio-impedance analysis" or "bia" or "bio-impedance vector analysis" or "bioimpedance vector analysis" or "biva" or "phase angle" or "extracellular water" or "electrical impedance" (824)
(4) "Heart Failure" (5903)	(8) "heart failure" or "congestive cardiac failure" or "ccf" or "left ventricular systolic dysfunction" or "lvsd" or "left ventricular diastolic dysfunction" or "lvdd" or "right ventricular systolic dysfunction" or "rvsd" or "right ventricular diastolic dysfunction" or "rvdd" or "right sided heart failure" or "left sided heart failure" or "biventricular heart failure" or "right-sided heart failure" or "left-sided heart failure" or "bi-ventricular heart failure" (16047)
Combining Search Terms	

(9) MeSH terms: (1) or (2) or (4) and (3) – 31 studies
(10) Individual terms: (5) or (6) or (8) and (7) - 121 studies
(11) Final search output: (9) or (10) – 128 studies
(12) When cut off from 1990 and selected for manuscripts available in English language – 120 studies